

#### **6.1.2.1 Monterey**

The Gato Ridge Anticline and the Los Flores/Cat Canyon Anticline are reflected at the surface in the marine Pliocene sediments and are mapped by Dibblee, **Figure 6.1-1, Surface Geology Map with Anticlinal Structures**. In the Gato Ridge Area there are two major faults to the east of the structure, **Figure 4.2-5, Monterey Structure Map**. The normal fault which is the most eastern fault is not sealing to production. It is sometimes referred to as the “Fugler Fault”. The un-named reverse fault which parallels the Gato Ridge Anticline has been demonstrated as sealing in the Monterey by elevated injection pressures and injection dye testing. Shut-in well pressures also add to the documentation. The other major faults in Cat Canyon Oil Field, i.e., Bradley, Garey, and Olivera, are demonstrated to be sealing by the pressure differences created by the oil and gas production activities along with some oil/water saturation differences or natural gas accumulation. **Figure 5.1-20, Monterey Formation Gradient Map with Pressures** highlights these sealing features. It should be noted that while the Monterey contains oil saturation throughout the study area, production and or injection is only possible where the structure creates natural fractures in the Monterey; the remainder is impermeable as shown by rapid pressure build up where voidage by production was not first created. The impermeable nature of the Monterey when not fractured is further demonstrated by the fact that one a Monterey injector is pressured up, the well maintains the pressure and does not decrease.

Those wells in Gato Ridge Area and the Central Fault Block with immediate high injection pressure (indicating no communication with the Monterey producing wells) are shown on the map. A dye test was conducted on the northern end of the Gato Ridge Area. It demonstrated communication within a one mile area on the south western side of the un-named sealing fault. Wells on the northeastern side of the same fault showed no communication in the dye test results even though they were closer to the injection well into which the dye was injected, **Appendix 6-III, Proof of Confinement**. The natural fracturing in the Monterey Formation appears to be more or less coextensive with the formation itself along the axes of major folding and faulting. Therefore the Monterey Formation production (where fractured) and the entrapment of the production (where fractured) reflect the same mechanisms as those found in a massive sand of the same aerial extent and thickness, (Hubbert & Willis, 1955). The rapid communication within the Monterey and its response like that of highly permeable, massive sands makes the enhanced recovery technique of peripheral water flood effective. Where natural fracturing does not occur, the Monterey Formation has low permeability. This is evidenced by the fact that the Monterey Formation without the benefit of natural fracturing cannot commercially produce nor accept injection below the fracture pressure; thus, providing proof of lateral confinement in those areas without natural fracturing.

#### **6.1.2.2 Sisquoc Formation below the Upper Confining Layer**

In addition to the sealing faults discussed above, the structure on the southern end of Gato Ridge also provides confinement. The Gato Ridge anticline wraps the southern area; where the formations have been uplifted to the extent that the Upper Confining Layer of the Sisquoc outcrops. Because many of the sands within the Sisquoc Formation (below the Upper Confining Layer) are found in the structural lows, Sisquoc deposition was likely coeval with structural uplift. Coarse sands were likely deposited in a near-shore, marine environment, while finer sediments were probably deposited in the deeper marine areas.